

5.2.2 Backfill Placement Verification

This section presents verification measurements that will be performed to demonstrate that the backfill material has been placed to the vertical and horizontal limits and extents required by the EPA-approved design documents. Similar to the sediment dredging, verification of the completion of the materials placement will be performed on a “management unit” basis. The number and orientation of DMUs will be determined in coordination with the contractor based on their means, methods, and construction sequencing. It is anticipated that the DMUs will generally align with the dredging “lanes” depicted on the dredge plan, RAB-specific conditions, and the overall thickness of backfill materials to be placed.

After dredging is completed in a DMU, interim backfill material will be placed over the dredged surfaces as soon as possible after dredging is accepted as complete and subject to z-layer sampling (if applicable for a particular DMU as described in Section 5.3.1.1). The 6-inch layer of backfill will be verified using electronic data gathered by the positioning system on backfill placement equipment and field observation of material placement.

For the final backfill layer placement, the CQC and CQA programs involve measuring the thickness of the layer placement to verify that the required thickness has been achieved by surveying the post-backfill surface elevation and comparing that to the post-dredge surface elevation. Additionally, the survey will verify that final target elevations have been met.

Once the backfill material has been placed, post-placement verification surveys will be performed by the Owner using the same surveying methods and spacing described in Section 5.1.1.

As discussed in Section 6, daily and weekly reports will be prepared by the Owner to track cumulative volume placed as well as production and coverage. In accordance with the AOC, weekly (during active construction) or monthly (during no active construction) progress reports will be prepared and submitted to EPA.

5.3.1 Sampling Objectives and Approach

5.3.1.1 Post-dredge Sediment Z-layer Monitoring

As described in Section 1.3.2 of the Final EE/CA (Anchor QEA 2011), EPA communicated in a meeting on January 27, 2011 that although the EPA-approved removal action alternative includes the removal of the full horizontal and vertical extent of total PCB RvAL exceedances in the RAB and existing data is sufficient to document the sediment quality below these exceedances, EPA will require collection and analysis of the post-dredge surface sediment z-layer samples to fulfill the Washington State Department of Ecology's (Ecology's) request for this information. The z-layer is defined as the 0- to 1-foot interval below the post-dredge surface elevation, prior to backfill placement.

To confirm the post-dredge sediment z-layer chemical concentrations, six sub-surface sediment cores will be collected within the in-water portion of the RAB as shown in Figure 2. Additional material below the 0- to 1-foot sample interval may be archived by the Owner for potential future data evaluation needs. As described in Section 5.4.3.1, sediment z-layer sample collection will be attempted prior to backfill placement, if possible. If backfill has been placed prior to z-layer sample collection, core samples will be collected through the backfill to facilitate sampling of the 0- to 1-foot z-layer below the backfill material.

EPA has acknowledged that the removal action activities may result in a thin layer of sediments with residual total PCB concentrations deposited on the final post-dredge surface. Because of this acknowledgement, coupled with the extensive surface and subsurface data collected within the RAB, EPA approved (EPA 2011b) the Final EE/CA (Anchor QEA 2011) condition that the results of any post-dredge sampling and analysis would not trigger any further remedial actions unless the area weighted concentrations in the RAB are greater than 20 times the RvAL or 240 milligrams per kilogram normalized for organic carbon. In this situation, further evaluation would be required and these data would be used to document that the surface backfill concentrations in this area(s) remain protective of human health and the environment based on the surface weighted average concentrations in the RAB.

5.3.2.2.3 Perimeter Surface Sediment Monitoring

The proposed perimeter surface sediment sample locations are shown on Figure 2. Surface sediment grab samples are systematically distributed within two different monitoring areas, including the adjacent Federal Navigation Channel area and one upstream area.

Six sediment grab samples will be collected from both the adjacent area and the upstream area. The 12 samples will be collected for the chemical analyses described in Section 5.3.3. The sample coordinates for each of the sediment grab sample locations are listed in Table 1.

5.3.3 Chemical Analytical Parameters

The post-dredge sediment z-layer samples (six samples) and the perimeter surface sediment monitoring samples (12 samples) will be submitted for analysis of the following parameters:

- Total PCB Aroclors
- Total organic carbon
- Metals (i.e., arsenic, cadmium, chromium, copper, lead, mercury, silver, and zinc)
- Total solids
- Grain size

As described in the EE/CA (Anchor QEA 2011), these COCs are consistent with the COCs identified within the RAB at elevated concentrations.

Post-excavation shoreline bank z-layer samples (six total samples) will be submitted for analysis of the full list of SMS analytes provided in Table 2.

5.3.4 Monitoring Timing

5.3.4.1 Post-dredge Sediment Z-layer Monitoring

Post-dredge sediment z-layer samples will be collected at the locations shown in Figure 2 after the completion of dredging and, if possible, prior to interim backfill placement (dependent on final construction sequencing). If the samples are collected prior to backfill placement, backfill material may be placed immediately following sampling (i.e., backfill placement is not affected by the z-layer analytical results).